

APPARATUS, SYSTEM AND METHOD FOR ONE-OF-MANY POSITIONS  
MODULATION IN AN IMPULSE RADIO COMMUNICATIONS SYSTEM

ABSTRACT OF THE DISCLOSURE

Apparatus, systems and methods for transmitting and receiving one-of-many positions modulated impulse radio signals. An impulse radio receiver for demodulating a received impulse radio signal that is modulated according to a one-of-N positions modulation scheme, where N is the number of different possible positions where an impulse can be located within each time frame of the impulse radio signal, comprises a timing generator, one or more samplers and a data detector. The timing generator generates N timing signal, wherein each of the N timing signals is separated in time by more than  $\frac{1}{2}$  the width of impulses of the received impulse radio signal. The one or more samplers are triggered to sample the received impulse radio signal in accordance with the N timing signal and to provide a first to Nth sampler outputs. The data detector produces a demodulation decisions based on the first to Nth sampler outputs.